Dynamic and Sensitivity Analysis of Islamic Financing and Economic Development

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Abstract

Islamic banking achieved remarkable growth as a result of structural developments in products innovation over recent decades. In the aftermath of Global Financial Crises (2008), the growth has been fuelled with faster growth in Islamic banks financing. However, the research mostly remained focused on concepts like risk sharing, liquidity issues and financial innovation, during the formative years of Islamic banking. Examining the influence of Islamic banking on economic development under different economic condition, therefore, largely remained an unexplored area. This study aims to look into this aspect of Islamic banking and applies dynamic and sensitivity analysis techniques to determine the effects of Islamic financing on the economic growth during different economic periods. The study finds a positive relationship between Islamic banks financing and the economic development. Speed of adjustment estimator provides trade-off between speed of adjustment and cost of being off target. The study provides useful guidance for economists and policy makers to corroborate Islamic banks financing as one of the important drivers of GDP growth. Furthermore, a greater understanding of this framework could be established by investigating the comparative impact of Islamic and conventional bank financing on economic development.

Keywords: Islamic banks financing, Economic growth, Dynamic modelling.

KAUJIE Classification: J3, K0

JEL Classification: E44, G2

1. Introduction

The guiding mechanism of Islamic banking system is that although interest is prohibited, profit and trade uplifts are encouraged (Farahani,

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Sadr and Hossein, 2012). Islamic financial structure involves transactions and financial instruments that satisfy traditional Muslim strand against engaging in gambling, speculation and interest payment (Tabash and Dhankar, 2014). During past some years, Islamic finance emerged as an important indicator of economic and financial development of economies, particularly with regard to Islamic capital markets. As aftermath of global financial crisis (GFC) 2008, the development of Islamic banking system and growth of Islamic financial instruments has outperformed the conventional financial assets (Tabash and Dhankar, 2014). It is accepted in general that GFC 2008 has provided a number of lessons to financial institutions in both the developed and developing economies. The net effect of the crisis was reduced volume of debt and equity financing available to businesses and distressed financial market operations (Aubuchon and Wheeklock, 2009). In purview of the crises, however, Islamic financial institutions achieved exceptional growth in both Muslim and Non-Muslim societies. The rapid growth of Islamic financial system has set the stage for global integration (Furqani and Mulayani, 2009). In comparison to research on conventional system, the strand of research on Islamic finance mainly attempted to discuss certain components of Islamic banking such as stability, liquidity, innovation and risk management. However, the significance of Islamic financing on economic growth under different economic conditions remained less-explored, particularly in developing markets. This study aims to fill this gap by investigating the dynamic relationship between Islamic financial development and economic growth of developing markets like that of Pakistan.   It investigates the impact of Islamic financing on economic growth of the country during different economic periods namely, economic growth periods, economic crises and recovery periods.

The study focuses on the following objectives:
a) To investigate whether and how Islamic financing has impact on economic growth;
b) To ascertain whether and how the impact of Islamic financing differs across different economic periods;
c) To examine whether Pakistani economy has dynamic economic growth, and
d) To investigate whether the speed of adjustment towards target economic growth differs across different economic periods.

2. Empirical Literature Review

Over the last two decades, Islamic banking has achieved remarkable growth in both Muslim and non-Muslim countries and warranted itself as

an alternative to the conventional spat of banking system. In terms of size and numbers, Islamic banks are operating worldwide and have recorded significant growth rates (Ahmad, 2004). According to Muhammad and Omar (2012), Islamic banking system would control over 50 per cent of savings in Islamic markets within next decade as predicted by the bankers. The Sharī'ah-compliant financial securities/products have become one of the remarkable growing segments of financial sector, operating in over 75 countries (Cihakand Hesse, 2008). In spite of the small size and recent history of Islamic banking and finance, its relationship with economic growth has been tested empirically by some researchers. Such studies can be broadly categorized into two types: those which test this relationship while taking a single country as a case and others who take a group of countries for this purpose. In this connection, the pioneering attempt is made by Furqani and Mulyany (2009) who used real GDP per capita, fixed investment and trade as indicators for real economic activities, while total Islamic bank financing was used as an indicator of Islamic banking intermediation. They reported significant long-run bi-directional relationship between Islamic financing and fixed investment. Likewise, Majid and Kassim (2014) also examined the contribution of Islamic banking and financial institution to economic growth in the context of Malaysia. They focused on post-1997 economic turmoil in the country and found significant unidirectional causality from Islamic banking and financial institutions' development to economic growth.

Taking Bahrain as a case study, Tabash and Dhankar (2013) investigated relationship between development of Islamic finance and economic growth. According to the findings of this study, Islamic banks' financing is positively and significantly correlated with economic growth in the long run. Tabash and Dhankar (2014) conducted similar study taking UAE as a case to empirically test the relationship between Islamic financial system and economic growth. In another study, Tabash and Dhankar (2014) examined relationship between development of Islamic financial system and economic growth in Saudi Arabia.

Hence, though a few studies have been conducted on strand of Islamic finance; however, they remained concentrated on efficiency of Islamic banks as compared to conventional banks in terms of some intermediate economic targets; such as sustainable economic growth, lowering unemployment and curtailing the inflation (Darrat, 1988; Furqani and Mulyany, 2009). Furthermore, progression of research on Islamic and conventional banking to date remained focused on static modelling; while the dynamic effect (internal and external economic shocks) remained less

explored. This study brings into focus importance of different economic periods in explaining the sensitivity relationship between Islamic banking and economic growth. In the light of above, the study warrants the need to investigate the impact of Islamic financing on economic growth of developing markets during different economic periods namely, economic growth periods and economic crises and recovery periods. In this progression, present study mainly aimed to investigate the dynamic relationship between Islamic financial development and economic growth of developing country like Pakistan.

3.   Methodology

The study pertains to Islamic banks in Pakistan for which secondary data have been collected from audited financial statements available on official sites of the banks. The data for economic growth pertains to period from 2003 to 2008, whereas the data for economic crises and recovery period pertains to 2009-2014. Levin Chin and Chu, Fisher Chi Square, PP – Fisher Chi Square and Pesaran and Shin W-Statistics validated the stationarity of data. Moreover, first difference analysis validated that data was predictable and could be modelled for dynamic analysis. The dynamic model (Generalized Method of Moment) provides efficient estimator and long-term relationship between the instruments (Pikas et al). Moreover, GMM provides estimation of speed of adjustment (Lemmon, Michael and Jaime, 2008). The Sargan Test was used for testing over-identifying restrictions in our statistical model.

According to Pakistan's Bureau of Statistics (2013-14), the economy of Pakistan experienced a tremendous growth during the period 2003-2007 when on average 7% yearly GDP growth was observed. In early 2008, warning signs of economic downfall emerged as rate of inflation began to rise. The condition significantly worsened in mid-2008 due to global recession, political instability and brisk increase in interest rates. The devastating global economic crisis had shown roaring effect on the financial and industrial sectors of Pakistan (Ali and Afzal, 2012). It is apparent from Pakistan's Economic Outlook as shown by Trading Economics/Pakistan Bureau of Statistics (2014) that Pakistan's economy had enjoyed relatively strong economic growth and performance until 2008. However, as a result of the crises, the GDP growth destabilized – reduced from 7% to 1.7% in 2008-2009, 3.1% in 2009-2010, followed by 3% in 2010-2011 (Business Recorder, 2012). As a result of later developments and seminal initiatives taken by Government of Pakistan, the financial, economic and social development uplifted the financial markets in Pakistan. Keeping in the view volatility in economic growth of

Pakistan under different economic periods, the study has partitioned the dataset into economic growth period (2003-2008) and economic crises & recovery period (2009-2014) on the basis of GDP trend.

The study conducts sensitivity analysis to look into the effect of different economic periods on the relationship between Islamic financing and economic growth. In line with the literature review, appropriate variables have been established and relationship between variables determined by employing dynamic modelling. The study employed dynamic estimator for the independent variables i.e. lag of GDP, Islamic Banks Financing (IBF) and Gross Fixed Capital Formation (GFCF) through modes of financing as a proxy for Islamic banking sector. The GDP was taken as proxy for economic growth. Whenever the researchers talked about variable for economic growth they used GDP to operationalize it (Beck et. al, 2000). Gross domestic product is considered as principal variable to reflect growth (Tabash and Dhankar, 2014)

In line with dynamic framework, the study examines the dynamics of the relationship between the explanatory variables and economic growth. The dynamic analysis addresses the volatile nature of economic growth and provides better insights into the adjustment process towards the target economic growth. Conversely, the static model generally fails to depict the internal and external dynamic economic shocks that affect the economic growth. Moreover, static modelling assumes the economic growth, which may not be optimal due to high adjustment cost of countries' economic targets. The equation 1 indicates the target economic growth that is the function of estimated model and several variables (Ozkan, 2001):

$$ GDP_t^* = \sum_{j=1}^{k} \beta_j \, X_{jt} + \varepsilon_j \qquad (1) $$

GDP_t^*	=	The target GDP of country in year t
k	=	Number of independent variables
ε_t	=	The error term

To achieve the desired economic growth, the countries adjust their current GDP_t with the degree of adjustment coefficient "λ". The equation 2 explains the partial adjustment model:

$$(\text{GDP}_t - \text{GDP}_{t-1}) = \lambda \; (\text{GDP}_t^* - \text{GDP}_{t-1}) \tag{2}$$

GDP_t $\qquad$ = $\qquad$ The current GDP of country in year t

GDP_t^* $\qquad$ = $\qquad$ The target GDP of country in year t

$\text{GDP}_t^* - \text{GDP}_{t-1}$ = $\qquad$ The target change

λ $\qquad$ = $\qquad$ Represents the rate of convergence

Based on this equation, if $\lambda = 1$, then actual change in GDP is equal to the desired change and the adjustment is cost free. If the value of the λ is greater than one, it implies that the country makes more adjustments than necessary and is eventually unable to achieve the optimal level of GDP. If $\lambda = 0$, there is no adjustment in economic growth, therefore, country sets its current GDP level to the past GDP level. According to Ozkan (2001), the past history of the determinants also affects the current decision making. Based on previous studies, this study employs dynamic model which focuses on current and lag variables. The equation 3 includes the current and lag of explanatory variables, with the inclusion of unobservable time-fixed effect. This analysis assesses the factors which are associated with the country's economic development through Islamic Bank Financing.

$$\Delta\text{GDP}_t = (1-\lambda)\,\text{GDP}_{t-1} + \beta_1 (\text{IBF})_t + \beta_2 (\text{GFCF})_t + \beta_3 (\text{IBF})_{t-1} + \beta_4 (\text{GFCF})_{t-1} + \mu_t + \varepsilon_t \tag{3}$$

ΔGDP_t $\qquad$ = $\qquad$ The difference in the GDP of country in time t

IBF $\qquad$ = $\qquad$ Islamic Bank Financing

GFCF $\qquad$ = $\qquad$ Gross Fixed Capital Formation

$(\text{GFCF})_{t-1}$ $\qquad$ = $\qquad$ Lag of Gross Fixed Capital Formation

$(\text{IBF})_{t-1}$ $\qquad$ = $\qquad$ Lag of Islamic Bank Financing

μ_t $\qquad$ = $\qquad$ Represents the invariant time-specific effect

ε_t $\qquad$ = $\qquad$ Disturbance Term

4. Data Analysis

Table 1 explains the dynamic analysis of GMM based on different economic periods. The empirical results corroborate significant association between economic growth and Islamic financing, particularly during economic crises period. The positive association of IBF with economic growth in both economic periods indicates that Islamic banking

appears to be a complement to, rather than substitute for, conventional banking (Kpodar, 2010). Islamic banking can be said to be a substitute in non-Muslim societies where they just care about risk minimization with return maximization. Dozens of studies verified stable and protective nature of Islamic financial institutions against risk and crises (Sukmana and Kholid, 2010; Beck et al., 2013; Al-Khazali et al., 2014; Ho et al., 2014). Islamic banking rely on real assets rather than inflammatory assets or derivatives that results into better stock market performance (Beck et al., 2013). Some researchers even contended, 'most, if not all, of the factors that have caused or contributed to the development and spread of the crisis are not allowed under the rules and guidance of Sharī'ah so crisis would not happened if all financial institutions were Islamic (Kayed and Hassan, 2011). While in case of Muslim countries, above all these factors, Islamic banking is getting popularity as a religious brand so it brings into significance that IBF is complement rather than merely a substitute of conventional banking.

Notably, the influence of IBF on Pakistan's economic growth is positively significant during economic crises and recovery period which supports the findings of Tabash and Dhankdar (2014) that Islamic banks financing has outperformed the conventional financial securities after the outbreak of global financial crisis. Furthermore, this research unveils another promising area for future research that Islamic banking may render institutional environment that is defined by Islamic region when Sharī'ah laws are strictly enforced. For Pakistan, the need of observing the impact of IBF on growth arises because of the difference in institutional environment. Pakistan is one of the developing countries and in terms of finance its economy is characterized as bank based economy where contribution of stock market is at lower side. Most of the developed countries have market based economy where companies are being supported and protected. Performance of IBF seemed to be highly influenced by such differences in institutional environment.

Surprisingly, the substance of lag IBF is also significantly perceptible across both economic periods, which further provides evidence that Islamic financial development in the long run is significantly correlated with economic growth of Pakistan's economy. Contrary to IBF, the Gross Fixed Capital Formation (GFCF) revealed mixed statistical relationship with economic growth during different economic periods. For instance, GFCF maintained positively significant relationship with GDP during growth period; however, it tended to have negative association during crises period. The possible explanation to such finding is that during

economic growth the increase in capital formation represents increase in investment and this in turn causes increase in level of national output (Bakare, 2011). Precautionary measures were taken to check the effect of IBF on GFCF. We run diagnostic testing of heteroskedasticity and multicollinearity. These two variables are significantly correlated, but no multicollinearity was found. Variance inflation factor (VIF) detects the degree of multi colliniarity (Robinson and Schumacker, 2009). VIF for these variables is 1.78 which predicted absence of multicollinearity problem. Consistent with these findings, the past history of GFCF also maintained the similar relationship with GDP.

In the light of above strand of statistical outcome, the findings support the Harrod-Domar model which provided that economic growth of the economies is directly and positively related to capital formation. It is also consistent with Bakare (2011) that more an economy is able to save and invest; the greater will be the economic growth. From econometric perspectives, the significance of Sargan test validates the health of instruments in estimation of dynamic models (GMM). The Sargan test along-with serial correlation test produces better results for both periods dynamic modelling. The overall dynamic analysis recognizes the existence of dynamic economic growth of Pakistan as the substance of past dependent and independent variables is clearly perceptible. The Wald test indicated that the estimation of the instruments is approximately normal with the proposed value. Moreover, both analyses fulfil the basic requirements of Difference-GMM tests which validate the robustness of dynamic modelling.

Table 1: Dynamic Analysis of Economic Growth Based on Islamic Financing

Dep. Var	Independent Variables	Economic Growth Period (2003-2008)	Economic Crises& Recovery Period(2009-2014)
		Dynamic Analysis (GMM)	**Dynamic Analysis (GMM)**
GDP	Lag GDP	0.80 (1.76)***	0.85 (3.52)***
	IBF	0.064 (4.04)*	0.124 (3.65)***
	GFCF	0.152 (2.82)**	-0.022 (-3.76)**
	Lag IBF	0.832 (2.64)**	0.632 (4.51)**
	Lag GFCF	0.231 (4.32)*	-0.331 (-7.32)**
	Obs.	-	-
	AR(1)	0.09	0.12
	AR(2)	0.16	0.23
	Sargan Test	0.36	0.42
	Time Fixed Effect	Yes	Yes
	Half-life	3.09 years	4.25 years

Note: Table 1 provides the estimations of dynamic model equation 3 by employing panel data based on two datasets, economic growth period (2003-2008) and economic crises and recovery period (2009-2014). The explanatory variables are Lag GDP, Islamic Banks Financing (IBF), Gross Fixed Capital Formation (GFCF), lag IBF and lag GFCF. The dependent variable is GDP per capita. The values shown in parentheses are calculated using dynamic panel model estimator. The tests for serial autocorrelation denoted as AR1 and AR2. The Sargan test indicates the variables health in estimating the dynamic model. The significance levels are given below:

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

With dynamic panel dataset, the Table 2 is able to evaluate the estimated speed of adjustment (SOA) with respect to economic growth of Pakistan across two different economic periods. Table 1 reports the estimated SOA towards target economic growth using panel data for the period of 12 years from 2003 to 2014. The SOA is indicated by λ .

Table 2.   Estimates of the Speed of Adjustment (SOA)

Dynamic Model (GMM)	Speed of Adjustment (SOA) during Economic Growth Period				Dynamic Model (GMM)	Speed of Adjustment (SOA) during Economic Crises and Recovery Period			
	λ	Half-life				λ	Half-life		
		Log (0.5)	Log(1-λ)	$\dfrac{Log(0.5)}{Log(1-\lambda)}$			Log (0.5)	Log(1-λ)	$\dfrac{Log(0.5)}{Log(1-\lambda)}$
	0.2	-0.3	-0.09691	3.09 years		0.15	-0.3	-0.07058	4.25 years

Note: Table 2 reports SOA towards target economic growth using panel data for the period of 12 years from 2003 to 2014. Half-life is the number of years that the SOA may imply for a country to move half way towards its target economic growth.

Half-life is the number of years that the SOA may imply for Pakistan's economy to move half way towards its target economic growth. Based on data sample of economic growth period, the application of speed of adjustment estimator provides evidence that the adjustment process of Pakistan's economic growth towards target economic growth takes about 3.09 years to remove half of the effect of internal and external economic shocks on its target growth if the GDP is dependent on the current and lag explanatory instruments. Notably, the range of speed of adjustment becomes more during economic crises and recovery period (4.25 years). It shows how different economic shocks could affect the target growth of economies. Furthermore, the process of adjustment indirectly explains the significance of time fixed effect in explaining the adjustment process between current and target economic growth. The inferences clearly explain that Pakistan's economy is more capable to quickly adjust its

target economic growth during growth period as compared to crises and recover periods.

5. Conclusion

The study has essentially set out the importance of Islamic financing on the Pakistan's economic outlook during different economic conditions. It specifically examined the dynamic relationship between Islamic banks financing, gross fixed capital formation and economic growth. In trying to achieve the key objectives, the dynamic and sensitivity analysis was conducted to investigate whether and how the current and past history of financing instruments tends to influence the GDP of Pakistan during different economic periods; e.g, economic growth period and economic crises & recovery period. Furthermore, the dynamic model has been extended to determine the speed of adjustment of Pakistan's economy towards target economic growth. The outcome of the study based on dynamic modelling (GMM-step two differences), sensitivity analysis and speed of adjustment estimator indicated that Islamic banks financing maintained positively significant association with Pakistan's economic growth during both economic periods. However, the impact of Islamic bank financing is substantially more significant during economic crises and recovery period which accentuates a remarkable growth of Islamic banks financing which outperformed the conventional banks performance. These findings corroborate the importance of Islamic financing as one of key determinants of GDP. On the other hand, fixed capital formation tends to maintain different association with economic growth of the country during different economic periods. For instance, fixed capital formation was negatively related with economic growth during crises and recovery period. It, however, maintained a positive association during growth times. This strand of findings indirectly validates the impact of internal and external economic shocks on GDP of Pakistan.

The substance of past history of economic growth, Islamic banks financing and fixed capital formation on current economic growth is clearly traceable; hence, GMM step-2 difference recognizes the existence of dynamic economic growth of Pakistan's economy. The speed of adjustment estimator provided that Pakistan's economic adjustment process tends to take 3.09 years to reach its target economic growth during period of economic uplift, and 4.25 years during period of economic downturn. The possible explanation could be the fact that different economic conditions tend to have different economic inferences for the adjustment process, which as a result diverges the speed of adjustment towards target economic outlook across different economic periods due to

varying adjustment cost. A quick speed of adjustment occurs if the adjustment cost is lower, while slow speed of adjustment occurs due to high adjustment cost. This spat is consistent with Hovakimian, Opler and Titman (2001) that there is trade-off between cost of adjustment and cost of being off target.

The entire investigation endorsed that past history of economic growth, capital formation and Islamic financing along-with different economic periods indirectly influenced the economic growth. It warrants the need that Government should develop mechanism of economic outlook which is based on dynamic modeling to incorporate the impact of internal and external economic shocks on GDP. The findings of this study have a number of important implications for economists and several guidelines for policy makers. The key policy priority from perspectives of economists and financial analysts is to consider economic growth a dynamic aspect in the light of different economic shocks. Secondly, the State Bank of Pakistan and other monetary authorities need to consider Islamic banks financing an important driver of economic growth in determination of GDP mechanism. In purview of empirical findings, the Islamic banks financing as engine of economic growth, the policy makers must develop the Islamic banking system by creating conducive investment climate and improving infrastructure base of the economy to boost Islamic financing. As more data related to Islamic banking sector becomes available, greater understanding on economic outlook determination could be developed across emerging and developed economies. One could further undertake a comprehensive comparative study between developing and developed economies and also to investigate the factors which influence the speed of adjustment towards target economic growth. Moreover, the effect of other control variables on economic growth could also be separately investigated along-with dynamic and static modelling.

6. Limitations of Study

The current study brings into focus the contribution of Islamic banks financing in line with economic growth. The results revealed positively significant association between Islamic financing and economic growth. However, the important limitation lies in the fact that current study only investigated the impact of Islamic financing on economic growth. There is prolific room for further research, as a comparative dynamic analysis of contribution of conventional and Islamic banking to economic growth would address the seminal question that may arise about the proportional difference of impact of conventional and Islamic Banking on GDP growth rate.

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